OBSERVATIONS

OF THE

AURORA BOREALIS.

FROM SEPTEMBER 1834 TO SEPTEMBER 1839.

BY

ROBERT SNOW, Esq.

LONDON:

Printed for Private Circulation by

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AURORA BOREALIS OBSERVED AT

Ashurst ..... { 51° 16′ N. Lat.
1m 10s Long. West of Greenwich.

Dulwich Wood .. { 51° 26′ N. Lat.
0 19s Long. West of Greenwich.

OBSERVATIONS

OF THE

AURORA BOREALIS.

Ashurst, *September* 3, 1834.—A faint Aurora in the N. E. Frequent lightning in the N. W.

Ashurst, *December* 22, 1834.—At about 6^h a splendid Aurora made its appearance, extending from halfway between the stars *α Lyræ* and *α Aquilæ* to halfway between the star *α Ursæ Majoris* and the planet *Mars*. Its general altitude was the same as that of the Pole-star (N. Lat. 51° 16′), but it sometimes shot up as far as the star *α Cygni* in detached coruscations. In about ten minutes it died away, and the consequent sudden increase of darkness was very striking. It shone strongly again in about a quarter of an hour, and in five minutes more shot up to the star *β Ursæ Minoris*. A stately luminous arch succeeded, about 15° high, which was visible until a late hour.

Ashurst, *November* 17, 1835.—At 11^h a beautiful Aurora appeared. The sky was filled with the Auroral light from the W. S. W. to the E. S. E.; and the crown

of the arch reached the Pole-star, about which point the Aurora took a deep red tinge, and sent up streamers of the same colour. At $11^h\ 45^m$ the Aurora was confined to the N. W. portion of the heavens, and took in the constellation *Cygnus*. Some of the stars of *Ursa Major* were beautifully seen through the ruby-coloured Aurora. At 13^h (one in the morning) it clouded over, but as seen through breaks in the clouds the arch still seemed to be very bright and extensive; and so up to 16^h, (four in the morning.)

Ashurst, *November* 18, 1835.—After a day of heavy wind and rain, it cleared off at seven o'clock in the evening, when an Aurora, perhaps the most magnificent ever seen in this country, made its appearance. Between 8^h and 9^h there was a superb and well-defined arch, but less in span than that of last night, and having about half the altitude of the Pole-star, or 25° 38′. The crown of the arch was a little to the westward of the north. For an hour and a half, from above the crown of the arch, both white streaming columns and undulating sheets of Auroral light continued to flow, extending frequently to the zenith. The contrast of this illumination with the natural darkness of the sky in the south, and with the peculiar darkness in the north beneath the arch, was very remarkable. Some of the principal stars in *Ursa Major* were seen through the Auroral light, and others of the same constellation in the darker part of the sky. The whole Aurora entirely differed in character from that of last

night. Sky cloudless; wind fresh, blowing from the quarter whence the Aurora seemed to proceed. At 10^h the phenomenon began to fade away, and to be broken up into ill-defined nebulous masses, and at 11^h had nearly disappeared. Stars ill-defined in the telescope. Wind and rain succeeded on the 20th, 21st, and 22d of November.

Ashurst, *December* 13, 1835.—An evening of the greatest beauty. Stars tranquil, and admirably defined. The Aurora appeared at 5^h 30^m in detached masses, which once shot up faintly to *β Ursæ Minoris* At a little before 6^h a dull ill-defined arch appeared, with about half the general altitude of *Ursa Major*, or about 10°. At 8^h 30^m it became overcast, a curtain of cloud having been coming up slowly from the west for the last four hours.

Ashurst, *May* 19, 1836.—The Aurora appeared at dusk. The arch became gradually well defined, and the star *Capella* was seen in a striking manner in the dark portion beneath the arch. At 12^h 30^m the arch broke up into streamers, or rather columns, of white light, which rose as high as the Pole-star: these lasted a considerable time, and then gradually faded away, just before morning twilight.

Ashurst, *September* 10, 1836.—At about 9^h 40^m the Aurora appeared as a faint, broad, ill-defined, luminous arch. The sky towards the northern horizon

was excessively dark. In half an hour the Aurora took the appearance of a condensed nebulous cloud; and the star 12 *Canum Venaticorum*, then about $3^h\ 20^m$ west of its lower culmination, appeared at the edge of the Aurora, like the head or nucleus of a fine comet.

Ashurst, *September* 30, 1836.—At about $9^h\ 30^m$ the Aurora appeared as a very brilliant and distinct white arch about 8° high, from the more westerly portion of which a fine deep garnet-coloured blush spread itself over a great portion of the sky, although the moon was shining brilliantly. This was succeeded by irregular undulating flashes, resembling in character the remarkable display of November 18, 1835, but much less brilliantly developed. Soon after 10^h all trace of the Aurora was lost. The next morning was ushered in with violent wind and rain. The word "flash" is perhaps too expressive of rapidity of motion to be applied to the Aurora. A lambent undulating glow, like that of phosphorus, is an expression more truly descriptive of the phenomenon.

Ashurst, *October* 15, 1836.—Much Auroral light generally diffused throughout the sky. At midnight a few very faint streamers were perceptible. Sky calm and cloudless.

Ashurst, *October* 18, 1836.—An Aurora took place, which I was not able to observe. It was made mention of in the newspapers, and must have been very striking.

Ashurst, *February* 3, 1837.—Aurora suspected. Sky overcast.

Ashurst, *February* 4, 1837.—At 8^h the Aurora shone strongly, but was ill defined. A long streamer arose at 8^h 30^m with a diffused red blush. Wind strong; S. S. E. It has been blowing from the same quarter for the last two days, exactly opposite the quarter whence the Aurora proceeds.

Ashurst, *February* 18, 1837.—A very wet and stormy day. The clouds cleared off at about 10^h, when, notwithstanding the brilliancy of the moon, a very splendid irregular deep red arch appeared, passing through the zenith and touching the horizon in the N. E. and N. W. When it was first noticed the heavy clouds that were passing off towards the east were deeply tinged with red. After undergoing some changes difficult to describe, it grew fainter at 10^h 40^m. A white arch succeeded, which soon emitted streamers. At 11^h 10^m the Aurora had nearly disappeared, with the exception of a reddish patch between the stars *Arcturus* and *Regulus*, which, however, in ten minutes was no more to be seen. The next day was excessively wet, with a gale from the S. W. This Aurora was very generally observed, because the occultation of the planet *Mars* by the moon took place on the same evening, and many persons were on the look-out.

Ashurst, *April* 27, 1837.—Diffused Auroral light early in the evening.

Ashurst, *May* 6, 1837.—Night calm and frosty. The Aurora appeared about 25° high, at 11^h, with streamers from time to time tinged with red, which subsided into a general luminosity, exactly resembling day-break. This lasted all night. The star *Capella* was within the Aurora, and had a striking appearance. Rain on the night of the 8th. High east wind with hail-storms on the 9th. Hail and thunder on the 10th.

Dulwich Wood, *November* 5, 1837.—As soon as it became dark a fine Auroral arch was seen extending from the N. E. to the N. W. It was very steady, without streamers, and nearly white. Altitude about 10°. Some long bands of white cloud extended from the zenith, and converged gradually towards the crown of the arch in so singular a manner that I could scarcely repress the idea of their being connected with the Aurora. The moon was very bright, and about seven days old. At 11^h the arch was very brilliant, and white, as before, but very much broken into towards the west by dark clouds. The peculiar darkness beneath the white arch was well seen. At about 11^h 30^m the N. E. part of the arch, (which alone was visible owing to the clouds in the W. and N. W.,) broke up into condensed masses of light, and sent up a few faint streamers. But in a few minutes the whole character of the Aurora was changed. Just about midnight the arch broke up into the most brilliant white and garnet-coloured bands imaginable, which for beauty of colour and precision of arrangement exceeded any thing I

ever saw before. At $12^h\ 20^m$ this beautiful phenomenon was quite hidden by clouds from the W. and N. W.

Dulwich Wood, *November* 12, 1837.—Again the Aurora was very fine from 6^h until 11^h, though the moon was high and nearly full. The arch was not well defined, but there were some very fine white streamers and condensed masses of light, with from time to time a strong crimson blush of considerable extent, and as high as the Pole-star.

Ashurst, *May* 26, 1838.—A strong Auroral arch, fading away at about 11^h.

Dulwich Wood, *September* 13, 1838.—As soon as it became dark there was a steady bright arch extending from the N.W. to the S.W. Altitude about 10°. The star 12 *Canum Venaticorum* was near the crown of the arch. At about $10^h\ 45^m$ beautiful garnet-coloured streamers arose in the N. W., leaving a strong red blush for some time spread over the sky. Afterwards, a large portion near the crown of the arch broke up into very bright condensed masses emitting streamers. The peculiar dark appearance beneath the bright arch now became so remarkably well defined that it might have been mistaken for an impenetrable bank of vapour, had not the star 12 *Canum Venaticorum* been now visible within it. Streamers then arose out of the dark portion, and broke up its regularity. At $11^h\ 15^m$ the

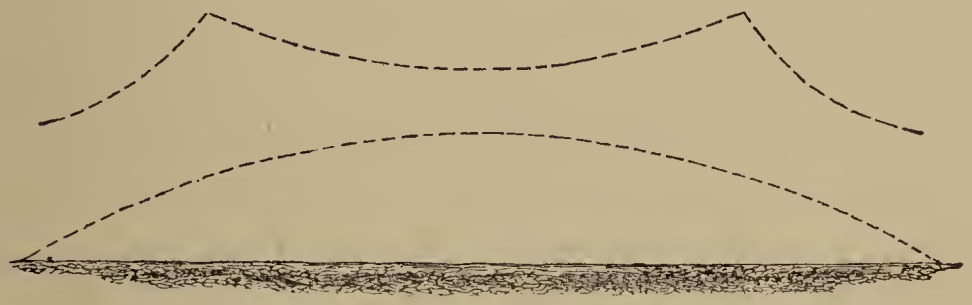
phenomenon began to fade away, and at 11^h 40^m was scarcely to be seen.

Ashurst, *September* 16, 1838.—A very beautiful Aurora. Arch ill defined, but with undulations rising as high as the Pole-star, with some noble columns of yellow light. Slight suspicion of redness for a few minutes.

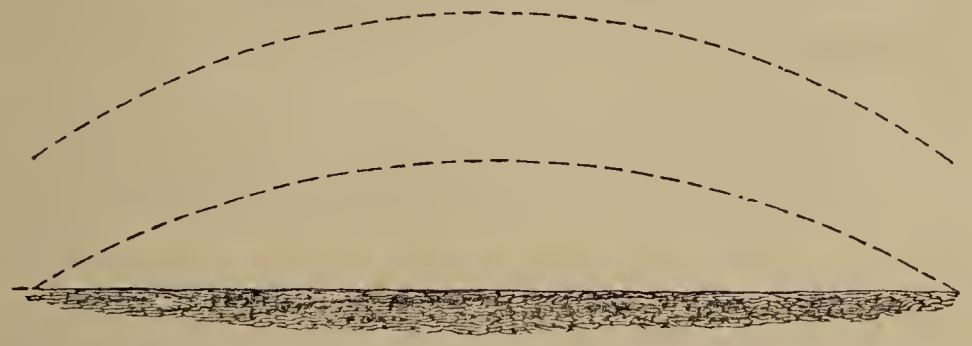
Dulwich Wood, *January* 10, 1839.—A strong well-defined white arch about 15° high, extending from N. N. E. to W. N. W. became visible immediately after dark. For several hours before dark the peculiar appearance of the sky in the regions of the Aurora betokened its presence. Soon after 8^h it lost its defined character, and the sky became overcast. There were no streamers. The next day was dark and windy with occasional rain. There had been a very heavy gale of wind on the 6th. The 12th and 13th were dark and windy.

Dulwich Wood, *January* 19, 1839.—At about 6^h after a very wet and windy day the sky cleared, and the Aurora was seen. The arch extended from the N. N. E. to the W. N. W. and was about 15° high. The star η *Ursæ Majoris* was within the luminous portion. The arch was very unsteady, shifting and moulding perpetually. At 6^h 20^m a mass of luminosity detached itself from the arch, and passed over the sky with some rapidity towards the stars *Castor*, *Pollux*,

and *Capella*, filling the region of the heavens between these stars, and having the appearance of a vast but faint nebula; and in five minutes more another portion became detached, but soon disappeared; and in a few minutes more the crown of the arch rose up into a rude cone of light, which soon separated itself from the main body of the Aurora, and passed over the Pole-star, and then melted away and disappeared; thus leaving three deep concavities or indentations in the upper outline of the arch, in the places where the masses flew off;



but in about five minutes more the usual appearance of the arch was restored, and its intrinsic brightness pos-



sibly a little increased.* At $6^h\ 40^m$ the dark portion beneath the arch began to be broken into, and invaded, in the usual way before the appearance of streamers,

* The above wood-cuts are not intended for accurate representations of the Aurora: but they give a good general idea of the outlines assumed by the arch under certain variable circumstances.

which, accordingly, rose up in about five minutes more. In fact, the whole Aurora was undergoing continual changes. Moon bright, and four days old. Soon after 7^h the Aurora became less changeable and less bright, and at 8^h seemed to be dying away altogether; but at 9^h 30^m it was very bright again; exhibiting a steady yellowish white arch 10° high, which remained until 11^h, with now and then a very faint streamer. The stars γ and ε *Cygni* were shining in the darkness beneath the bright arch. Rain came on at 4^h the next day, and the day after that was very wet.

Dulwich Wood, *May* 1839.—The appearance of the Aurora was mentioned in the newspapers twice during this month, but was not observed here.

Dulwich Wood, *June* 1839.—The Aurora suspected twice during this month whilst the sky was overcast.

Ashurst, *September* 3, 1839.—At about 10^h a fine Aurora was first seen through some openings in the clouds, which gradually cleared away. It appeared as a fine, unusually bright, but ill-defined mass, with the same general altitude as that of the seven bright stars of *Ursa Major*. Its extent was from about N. E. to W. S. W. It was soon after wholly obscured by clouds. However at 14^h, (2 o'clock in the morning,) it was in great brilliancy. The arch was still badly defined; but the finest imaginable streamers were visible in all

parts of the sky, accompanied by superb undulations, like the waving of a large body of flame agitated by the wind. Bright patches also flashed out in all parts of the sky in the most capricious manner. All the streamers were remarkably steady, and appeared to converge towards a point near the star *α Arietis*, then about 35^m east of the meridian. At $14^h\ 30^m$ there was a strong red blush in the west, and the same in the east at $14^h\ 50^m$, which, however, changed to yellow. It is remarkable that the greater part of these changes were seen to take place near the moon. The newspapers made mention of this Aurora. It was second in beauty to none that I ever witnessed, excepting that of November 18, 1835.

From the above observations it appears that the Aurora Borealis may be expected at any season of the year: that it assumes nearly all colours: that in shape and motion it resembles every variety of ordinary cloud: that its appearances are undulating, radiating, and streaming, with other capricious forms, not easily expressed in words, one or more of which are often assumed in the course of an evening: that the length of time during which it is visible is very uncertain: that it appears to the eye (geometrical considerations apart) as if it existed at various distances from the surface of the earth: that although for the most part it is not influenced by the presence or absence of clouds, it sometimes tinges them with its own prevailing colour:

that this has been chiefly noticed when the clouds are *low:* that there are also certain *lofty* cirrous clouds which have the appearance of arranging themselves in peculiar bands or strata as if in connexion with it: that as these are visible during daylight, they may serve to predict the apparition of the Aurora after sunset: that the stars are seen both well and ill defined through the luminous matter of the Aurora, as well as when they are seen within the *dark* portion beneath the *bright* arch: that the darkness under the arch does not wholly depend upon the effect of contrast; it is often characterised by a peculiar brown tint; and its connexion with the bright portion seems to be very intimate, for it is from within the dark portion that the streamers generally rise: that the Aurora is by no means limited to the northern regions of the sky: that with the exception of a diminution of its general effect, it is uninfluenced by moonlight: that in all probability it frequently occurs in the day-time: that its appearance seems to predict weather the reverse of frost, or heavy wind and rain: lastly, that it is wholly inaudible.

To this it may be added, that as our senses are the only inlets by which we receive impressions of facts, they should no doubt be held in readiness to let nothing escape notice which affects any one of them; taking especial care, however, as the eye may be "made the fool of the other senses," to guard on the other hand against the sympathetic affections of sense to which an unusual excitement of the eye may give rise. Thus, a spectator has been known to mistake the flush

of surprise arising from the sudden apparition of a *bright* meteor for a sensation of *heat:* and many country people, who witnessed the Aurora of February 18, 1837, which bore the red lurid hue of an extensive conflagration, declared that they *smelled it:* and a *hissing sound* is often in vulgar parlance said to accompany a flash of lightning at *the very instant of its occurrence*, quite distinct from the noise of the thunder, which succeeds after a certain interval. Without doubt the sound generally attributed to the Aurora, when seen on a magnificent scale, arises from giving way to similar illusions. The remarkable Aurora of November 18, 1835, was observed under very advantageous circumstances, in a quiet open spot, under a perfectly clear sky; but the fluttering wavy motion so closely resembled that of a large body of ordinary flame, that the spectator was compelled to exercise no small degree of control over his imagination before he could rest assured that a crackling noise like that of a large fire did *not* accompany the phenomenon, and that the sublime spectacle before him was indeed wholly inaudible. A brisk wind too, blowing in the very direction of the luminous undulations, favoured the illusion.

THE END.

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